1. A method to form a shallow trench isolation feature of an integrated circuit on the surface of a semiconductor substrate, comprising the steps of:

providing a semiconductor substrate having a surface coated with at least one layer of an insulating material and a plurality of shallow trenches formed in the surface of said semiconductor substrate;

growing a nitrogen doped insulating layer on internal surfaces of the shallow trenches;

depositing a gap fill insulating layer upon the surface of the semiconductor substrate to fill the shallow trenches; and

planarizing the gap fill insulating layer to remove excess material of the gap fill insulating layer from the surface of the semiconductor substrate while leaving the gap fill insulating layer within the shallow trenches.

2. The method of claim 1 wherein growing the nitrogen doped insulating layer comprises the step of treating the internal surfaces of the shallow trenches with an oxygen rich atmosphere followed by a nitrogen compound selected from the group of nitrogen compounds consisting of nitrogen gas (N_2), ammonia (NH_3), nitrous oxide (N_2O), and nitric oxide.

3. The method of claim 2 wherein the oxygen rich atmosphere is selected from the atmosphere consisting of steam and oxygen gas.

4. The method of claim 2 wherein the treating of the internal surfaces of the shallow trenches with the oxygen rich atmosphere of the shallow trenches is at a temperature from approximately 900° C to approximately 1000° C, at a pressure of from approximately 600 Torr to approximately to 760 Torr, for a period of time from 60 minutes to 120 minutes.

5. The method of claim 4 wherein the treating the internal surfaces of the shallow trenches with the nitrogen compounds is at a temperature of from approximately 900°C to approximately 1000 °C at a pressure of from approximately 600 Torr to approximately 760 Torr for a period of time of from approximately 30 minutes to approximately 90 minutes.

6. The method of claim 1 wherein growing the nitrogen doped insulating layer on the internal surfaces of the shallow trenches comprises exposing said internal surfaces to a nitrogen rich and oxygen rich atmosphere to thermally grow a silicon nitride layer on said internal surfaces of the shallow trenches.

7. The method of claim 6 wherein the nitrogen rich and oxygen rich atmosphere is at a temperature of from approximately 900 °C to

approximately 1000 °C, and at a pressure of from approximately 600 Torr to approximately 760 Torr for a period of from approximately 120 minutes to approximately 180 minutes.

8. The method of claim 6 wherein the nitrogen rich and oxygen rich atmosphere includes nitrogen compounds selected from the set of nitrogen compounds consisting of nitrogen (N_2) gas, ammonia (NH_3), nitric oxide (NO), and nitrous oxide (N_2O) and oxygen rich compounds selected from the set of oxygen rich compounds consisting of steam (H_2O) and oxygen (O_2).

9. The method of claim 1 wherein the gap fill insulating layer is selected from insulating materials consisting of CVD formed silicon oxide and spun-on-glass silicon dioxide.

10. The method of claim 1 wherein the planarizing is accomplished by chemical/mechanical planarization.

11. The method of claim 1 wherein the planarizing is accomplished by etching the gap fill insulating layer.

12. The method of claim 1 wherein the nitrogen doped insulating layer has a thickness from approximately 10 nanometers to approximately 30 nanometers.

13. A shallow trench isolation feature formed at the surface of a semiconductor wafer, comprising:

a plurality of shallow trenches formed in the surface of semiconductor substrate;

a nitrogen doped insulating liner grown on sidewalls of the shallow trenches; and

a gap filling insulating material filling the shallow trenches level with the surface of the semiconductor substrate.

14. The shallow trench isolation feature of claim 13 wherein the nitrogen doped insulating liner is formed by treating the sidewalls with an oxygen rich atmosphere followed by a nitrogen compound selected from the group of nitrogen compounds consisting of nitrogen (N_2) gas, ammonia (NH_3), nitric oxide (NO), and nitrous oxide (N_2O).

15. The shallow trench isolation of claim 14 wherein the oxygen rich atmosphere is selected from the atmospheres consisting of steam and oxygen gas.

16. The shallow trench isolation feature of claim 14 wherein the treating of the sidewalls of the shallow trenches with the oxygen rich atmosphere of the shallow trenches is at a temperature from approximately 900° C to approximately 1000° C, at a pressure of from approximately 600 Torr to approximately 760 Torr, for a period of time from 60 minutes to 120 minutes.

17. The shallow trench isolation of claim 16 wherein the treating the internal surfaces of the shallow trenches with the nitrogen compounds is at a temperature of from approximately 900 °C to approximately 1000 °C at a pressure of from approximately 600 Torr to approximately 760 Torr for a period of time of from approximately 30 minutes to approximately 90 minutes.

18. The shallow trench isolation feature of claim 14 wherein the nitrogen doped insulating liner is formed by exposing the sidewalls of said shallow trenches to a nitrogen rich and oxygen rich atmosphere thermally to grow a silicon oxynitride layer on said sidewalls.

19. The shallow trench isolation feature of claim 18 wherein the nitrogen rich and oxygen rich atmosphere is at a temperature of from approximately 900 °C to approximately 1000 °C, and at a pressure of from approximately

600 Torr to approximately 760 Torr for a period of from approximately 120 minutes to approximately 180 minutes.

20. The shallow trench isolation of claim 18 wherein the nitrogen rich and oxygen rich atmosphere includes nitrogen compounds selected from the set of nitrogen compounds consisting of nitrogen (N_2) gas, ammonia (NH_3), nitric oxide (NO), and nitrous oxide (N_2O) and oxygen rich compounds selected from the set of oxygen rich compounds consisting of steam (H_2O) and oxygen (O_2).

21. The shallow trench isolation feature of claim 13 wherein the nitrogen doped insulating liner has a thickness of from approximately 10 nanometers to approximately 30 nanometers.

22. The shallow trench isolation feature of claim 13 wherein the gap fill insulating material is selected from insulating materials consisting of CVD formed silicon oxide and spun-on-glass silicon dioxide.